silver nitrate is brought into contact with a drop of the supernatant yellow liquid.—Mr. Thomas Fletcher gives a brief note on a simple form of gas regulator, differing only in form from one described by Mr. Page in the January number of the *Chem. Journ.* for 1876.—Mr. Thomas Carnelley, B.Sc., F.C.S., contributes a paper on high melting-points, with special reference to those of metallic salts. The author describes a new method which he proposes for determination of high melting-points, and the results of his investigations by this new method. The principle of this new method is as follows:—In a platinum crucible a small quantity of a salt is placed, and the crucible suspended in the flame of a Bunsen's burner or of a blowpipe. If the temperature at which the salt fuses is not above a certain point, the temperature of the crucible after a time reaches that point. If, at the instant the salt is seen to melt, the crucible be dropped into a known weight of water of known temperature, and the rise in temperature noted, from the equation for specific heats, we obtain the initial temperature of the crucible at the time the salt melted, and hence the temperature at which the fusion occurred, assuming that the mean temperature of the crucible is the same as that of the salt at the moment of melting.—Numerous abstracts of papers published in other journals, together with a full account of the anniversary meeting of the Chemical Society, complete the contents of this number.

American Journal of Science and Arts, June.—We have here some interesting observations on Saturn, made by Mr. Trouvelot during the last four years with the refractors at Harvard, Washington, and Cambridge Observatories. He notes, *inter alia*, some singular dark angular forms on the inner margin of the first ring, outside the principal division of the rings; it seems due to a jagged conformation. The three outer rings have shown a mottled or cloudy appearance on the ansæ; the cloud-forms at some parts attain different heights, and change their relative positions. The dusky ring is not transparent throughout, as has been supposed; and it grows more dense as it recedes from the planet, so that, at about the middle, the limb of the planet ceases entirely to be seen through it; further, the matter of this ring is agglomerated here and there into small masses.—The "1474" line, which is reversed in the spectrum of the solar corona, coincides with one of the short lines in the spectrum of iron. It appears in ordinary spectroscopes like a fine hard black line; but in lately examining this part of the spectrum with a diffraction spectroscope armed with a silver glass "gitter platte" of 8640 lines to the inch, Prof. Young found the line to be unmistakeably double. The more refrangible line he regards as the real corona line; the other belonging to the spectrum of iron.—Mr. J. Lawrence Smith, in a paper on carbon compounds in meteorites (here concluded) arrives at some important results. The phenomena of the graphite nodules are very puzzling; the presence of such substances as free sulphur, and a hydrocarbon in the interior of the graphitic concretions was certainly not to be expected. We now know of celestial carbon (Mr. Smith says) in three conditions, viz., in the gaseous form as detected by the spectroscope in the attenuated matter of comets; in meteorites in the *solid* form, impalpable and diffused through pulverulent masses of mineral matter; also in the *solid form, but compact and hard*, like terrestrial graphite, and imbedded in metallic matter, that comes from regions in space.—From experiments on the diminution of the minute distance between two surfaces in contact, with the increase of the contact pressure (the substances being iron, brass, and plate glass), Prof. Norton found that the diminutions were very nearly the same, whatever the nature or condition of the surfaces in contact; that they were nearly independent of the extent of the surface in contact; and that the diminution of contact-distance for an increase of one ounce in the pressure, was nearly inversely proportional to the pressure.—Mr. Carey Lea describes experiments on the sensitiveness of silver bromide to the green rays as modified by the presence of other substances. Finding no red substance capable as such of increasing this sensitiveness, and on the other hand, many colourless substances which have that effect, he is confirmed in the opinion that there is no relation between the colour of a substance and that of the rays to which it increases the sensitiveness of silver bromide.—We further note a translation of M. Hartt's first report on the geological survey of Brazil, a paper by Mr. King on palæozoic divisions on the fortieth parallel, and an account of a nebula photometer, by Mr. Pickering.—Prof. Marsh describes some new fossil birds.

Archives des Sciences Physiques et Naturelles, Feb. 15.—From researches on the specific heats of saline solutions, described in this number, M. Marignac concludes that the specific heat depends not solely on the nature of the acids and bases of the salts; so that one cannot calculate it from their composition. It may be modified by other causes special to each salt, and the nature of which is still unknown. These causes do not seem to be connected with the greater or less tendency of salts to combine with water and form definite crystallisable hydrates.—It is a disputed point among physiologists whether fat is a product of decomposition of albumen. M. Secretan here describes an investigation on the subject. His experiments were on albumen decomposed in current water, and in the ground. He considers that the transformation in question is improbable, and accepts Orfila's theory, that the fat of dead bodies is only formed where there is already fat present, and an azotised matter.—In a paper on the constituents of woman's milk and cow's milk, M. Lachenal finds that the latter is richer in nitrogen, and consequently in albumenoid substances than the former, in the proportion of 3·51 to 2·53. After coagulation, the serum of cow's milk no longer contains either caseine or albumen, whereas the serum of woman's milk holds in solution a quantity of albumenoid matters which may be estimated at a half of the nitrogenised substances of the milk.—M. Gillieron studies the traces of ancient glaciers of the valley of the Wiese in the Black Forest.—In a reply to M. Soret, on the temperature of the sun, M. Violle describes some interesting observations on the radiation from incandescent steel.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 18.—"Note on a Simultaneous Disturbance of the Barometer and of the Magnetic Needle," by the Rev. S. J. Perry, F.R.S.

Linnean Society, June 15.—Prof. Allman, president, in the chair.—Prof. Rolleston read an interesting paper on the prehistoric pig of Britain, illustrating this by a series of skulls of species, wild and tame.—Dr. Masters followed by remarks on the superposed arrangement of the parts of the flower. The alternate arrangement in the parts is so general that exceptions are invested with peculiar interest. "Alternate" and "superposed" the author used in preference to the term "opposite," and he stated superposition exists in a large number of very diverse families. He then gave instances of apparent or false superposition in certain of the cultivated varieties of Camellia, &c. Real superposition may arise from (1) superposition of whorls, exemplified in the monstrous Daffodil (*Narcissus Eystettensis*; (2) spiral arrangement of parts, *e.g. Sabia*; (3) enation, chorisis, between which it seems necessary to draw a distinction, although the differences in the adult flower may not be always obvious (in chorisis the original organ is repeated, in enation the process is subsequent to the first stages of development, example scales before the petal in *Silene*); (4) abortion or suppression of intermediate whorls, *e.g*, Vine, &c.; (5) pleiomery, when numbers of successive whorls are unequal, some of the additional parts become superposed *Nigella* cited; (6) substitution of one organ for another, in *Zanthoxylum*; (7) torsion of the axis, either between two successive whorls or of constituent elements of whorl, exemplified in leaves rather than flower.—Dr. Masters then drew attention to illustrations of the relative position of the perianth and androecium in genera of the *Tiliaceæ* and *Olacaceæ*.—A paper by Dr. J. Anderson on the skeleton and feathering of the spoon-billed sandpiper (*Eurynorhynchus pygmaeus*) was read, and Mr. E. Harting in exhibiting skins of this rare Indian bird and its allies, made remarks thereon. Dr. Anderson shows that, excepting deviation in the bill, *E. pygmaeus* in detail agrees with the genus *Tringa*.—Mr. W. Archer gave a summary of a paper of his on the histology and development of the genus *Ballia*. The material for research was furnished partly by the *Challenger* and partly by the Transit of Venus expeditions, and obtained in Kerguelen's Land. The author found that the septa separating contiguous cells contained circular "pits" which were closed by plano-convex "stoppers," the purpose of which is difficult to determine. The pits do not communicate and the pair of stoppers, easily disturbed from their positions, resemble a rivet passing through the septum. He further described the peculiar manner in which the cells of the rachis are jointed together, the mode of development of the branches, the origin of the cortical investment of confervoid filaments, and tantamount modifications in nearly-allied species.—A second communication of Mr. Archer's was on fresh-water algæ collected

by Mr. Moseley in Kerguelen's Land.—Prof. Duncan then delivered an oral epitome of a joint research by himself and Major-General Nelson, R.E., on some points in the histology of certain species of Corallinaceæ. Quekett, about 1851, gave a good account of the minute textural peculiarities of the hard structures of corallines generally, and in 1866 Rosanoff published a memoir on the Melobesiæ, therein bringing to light many details of the softer structures omitted by the former. Major-General Nelson and Prof. Duncan now supplement the foregoing by further microscopic investigations on the living forms of Bermuda and Britain. On the shores of the former island the high and constant temperature conduces to a development and growth of the corallines not witnessed on our own sea-board, and the colours, moreover, are rich in proportion; for these and other reasons a more complete study of their development and physiology has been made. Starting from Quekett's and Rosanoff's labours, the recent researches show the presence of remarkable filamentous appendages to the dermal layer, which latter is composed of a loose cellular envelope, permitting the existence of large sub-dermal areas. The interior more aggregated cellular substance has certain radiating fibres running through, and which are modified at the joints. The growth of the cell-structure, semilunar bodies developed in the primordial utricle, the manner in which the deposition of carbonate of lime takes place, and other interesting facts, the authors elucidate and place on record. —Mr. R. B. Sharpe, in exhibiting a collection of birds from South-east New Guinea, collected by the Rev. S. McFarlane, and now deposited in the British Museum, pointed out that most of the forms had already been obtained by former travellers, though one species, *Graucalus augustifrons*, was new to science, as probably was a Bird of Paradise, so injured, however, as to prevent a correct description being made. The nest of a Bower-bird was also commented on.—A memoir on the Oxystomatous crustacea, by Mr. E. I. Miers, was taken as read, also two papers on New Zealand Ferns, by Mr. J. H. Potts; and notes on algæ collected by Mr. Moseley, of the *Challenger* Expedition, by Prof. Dickie; besides a paper by the Rev. J. M. Crombie, on lichens from the Island of Rodriguez, obtained by Dr. I. B. Balfour, 1874.—In an additional note relative to the Norwegian Lemming, Mr. W. Duppa Crotch referred to some recent information obtained supporting his formerly expressed views.—In the form of an oral abstract, Mr. S. H. Vines gave a lucid account of some late experiments and chemico-physiological investigations of his into the nature of the digestive ferment of *Nepenthes*. In the Pitcher-plant, at least, he pretty clearly proves that a secretion and other phenomena equivalent to the digestive process of animals obtains.

Anthropological Institute, June 27.—Col. A. Lane Fox, F.R.S., president, in the chair.—The election of two new members was announced.—Mr. Walhouse exhibited arrow-heads from Southern India, closely resembling forms met with by Lieut. Cameron in Central Africa.—Remains of red deer, wolf, with portions of a human skull, from the foundation of the Bath gas-works, were exhibited by Miss A. W. Buckland.—Mr. Hyde Clarke read a paper on serpent and siva worship and mythology in America, Africa, and Asia. The first part of the paper was devoted to an account of the Bribri and other Indians of Costa Rica in Central America, and on the immediate relations of their languages to those of Western Africa. This furnishes another connection of language besides the Carib with the Dahomey, the Guarani with the Agan and Alkhass, and the Quichua, Aymara and Maya, with Accad and Cambodian. The rest of the paper was devoted to trace the Central American one god Sibu, and his mythology to the old world. This word, as Sowo and Nebo, is in company found with Kali in West and Central Africa, over a wide area, representing god, spirit, idol, navel, &c. It was then illustrated with Siva and Kali, and the cosmogony and serpent worship in India; and further with Nebo in Babylonia, Seb in Egypt, Seba in Arabia and Phrygia. The title Sabaoth was referred to. The American legend appeared to point to a unity of God in the prehistoric epoch.—Mr. Park Harrison described marks found last summer on the chalk at Cissbury, some upon the walls of the galleries, and the remainder on rounded pieces of chalk.—Dr. Gillespie read a short note on the use of flint cores as tools.—The remaining papers were "on the term Mediterranean," as applied to a part of the human race; and a minute account of the Javanese, Mr. Kuhl.

Physical Society, June 24.—Prof. G. C. Foster, president, in the chair.—The following candidates were elected members of the Society:—Prof. James Dewar, F.R.S.E., and the Hon. F. A. Rollo Russell.—Prof. Guthrie showed the action of Prof. Mach's apparatus for exhibiting to an audience the effect of lenses on a beam of light passed through them. It consists of a long rectangular box with glass sides, in which are several movable lenses. A parallel beam of light falls on a grating at one end of this box and is thus split up into a number of small beams, which are rendered visible by filling the box with smoke. After passing through the first lens the rays fall on a movable white rod, which may be placed to indicate the focus. The light then falls on another lens partly covered with red and partly with blue glass in order to more precisely exhibit the paths of the rays.—Baron Wrangell exhibited the apparatus employed by Petrochovsky in his magnetic experiments. These experiments had reference to (1) normal magnetisation, (2) the measurement of the distance of the poles of a magnet from its ends, and (3) a thermo-electric apparatus. The determinations were very much simplified by employing a unipolar magnetic needle, formed by bending a small bar magnet at right angles at about a quarter of its length from one end. The needle is then suspended by a fibre attached to the end of the short arm, and the longer arm is maintained horizontally by a brass counterpoise weight. It will be evident that as one pole is in the axis of rotation, it cannot have any effect on the motion of the needle. By turning up each end in this manner the moment of the magnet may be ascertained without knowing the exact positions of the poles. If a magnetic needle be so placed that a bar magnet parallel to it has no effect in deflecting it from the meridian, and the bar be then struck with a brass hammer, the state of equilibrium will be disturbed, as is shown by the motion of the needle. This, however, is not the case with a piece of soft iron round which an electric current is passing. The apparatus employed in the experiments on "normal magnetisation" consisted of an arrangement for passing a current round rods of soft iron of varying lengths, so constructed that any number of the surrounding coils can be removed in the manner of an ordinary rheostat. After the current has been passed round the bar, it is moved until its residual magnetism has no effect in deflecting a delicate unipolar needle from the meridian. The current is then passed round it, and the coils are adjusted until the magnetised bar has still no effect on the needle. The effect of the coils themselves is counteracted by means of a subsidiary coil. When the current is thus adjusted, the bar is said to be "normally" magnetised, and M. Petrochovsky has ascertained that this condition is satisfied when the length of the coil is 0·8 times that of the bar, and this is independent of the strength of current. This, then, is the only case in which the position of the poles is the same as when the bar is charged with residual magnetism. For the determination of the positions of the poles of a bar magnet a somewhat complicated apparatus was employed. A large unipolar magnet about eight inches in length, provided with a bifilar suspension, was enclosed in a glass box. A fine silver wire was stretched parallel to the axis of the needle between two projections on it, and it also carried a fine index at the horizontal end. The wire is focussed in a telescope which can be made to travel along rails parallel to the magnet, and the index at the end can be observed by another telescope. A small magnet at right angles to the large magnet can be moved with the first telescope, and the point at which its effect in deflecting the unipolar is the greatest is ascertained by varying its position parallel to itself along a graduated scale and then observing the space through which a subsidiary magnet must be moved in order to restore the unipolar to its original position, as observed in the second telescope. When this point is reached it must be exactly opposite the pole of the large magnet. It was thus found that the poles are at a distance of one-tenth of the length of the magnet from its ends. To determine the position of the poles of a horse-shoe magnet a delicate magnetic needle is placed below a fine wire in the meridian and a horse-shoe magnet is brought so that its two ends are immediately below the wire and near the needle. In the case of an electro-magnet the point at which its effect is greatest is found to vary when the coils are moved towards the ends, and is nearest to the ends when the coils project slightly beyond them. The third series of researches referred to was on the influence of an electric current on the thermo-electric action of soft iron. A number of strips of iron are connected by means of copper studs, and when currents are passed round the alternate strips it is found that the system acts as an ordinary thermopile. This question is, however, still under investigation. In reply to a question of the President, Baron Wrangell stated that the effects of increasing the number of coils in the horse-shoe

magnet on the position of the poles is also still under investigation.—Prof. Barrett then made a brief communication on the magnetisation of cobalt and nickel. He has recently made some experiments on these metals with a view to ascertain whether they undergo any elongation or contraction similar to that experienced by iron during magnetisation. From this first experiment he concluded that cobalt elongates slightly, but that there is no effect on nickel, but this latter result may have been due to the fact that the metal was not absolutely pure. He has, however, obtained through Mr. Gore a fine bar of pure nickel about two feet in length, and now finds that it contracts, and that the amount of this contraction is about the same as the expansion of a like iron bar when similarly treated.—Prof. Guthrie then described some experiments on the freezing of aqueous solutions of colloid substances, which he has been studying in connection with his recent investigations on cryohydrates, &c. If a solution of sugar be gradually cooled the temperature at which ice separates out is always below 0° C., and the extent below increases with the amount of sugar in solution; but he finds that in a solution of gum having exactly the same chemical formula, the ice always separates at 0° C., whatever be the amount of gum present. Thus while every crystalline substance forms a freezing mixture when mixed with ice or snow, colloids are incapable of doing so. The gum and the water do not recognise each other: and similar results were obtained in the case of gelatine and albumen. These facts are strictly in accordance with the results of Prof. Graham's classical researches. It almost follows that, when heated, similar effects are observed, and Prof. Guthrie has found that solutions of gum in varying proportions always boil at 100° C. Mr. W. Chandler Roberts said that this important discovery was one that his late distinguished master would have welcomed, and he expressed a hope that Dr. Guthrie would continue his experiments with the series of colloids actually prepared by Graham.—Prof. Guthrie then showed the experiment by which Dr. Kerr has recently proved that glass, resin, and certain other substances exhibit a depolarising effect when under the influence of a powerful electrical tension. With the help of Mr. Lodge, Dr. Guthrie has succeeded in repeating these exceedingly delicate observations, but the effect is very slight and ill-suited for the lecture-room. A beam of polarised light traverses a thick plate of glass in which two holes have been drilled nearly meeting in the centre, and two wires are fixed in these and connected with the terminals of a powerful coil. The light after passing through the analyser falls on the screen. If now the analyser be so turned that the illumination is least before the current is turned on, the brightness of the field will be seen to increase as soon as the circuit is closed, and this brightness will increase up to a certain limit. The effect is greatest when the light is polarised at an angle of 45° to the line joining the terminals.—The President then adjourned the meetings of the Society until November.

PARIS

Academy of Sciences, July 3.—Vice-Admiral Paris in the chair.—The following papers were read:—On the fermentation of urine, by MM. Pasteur and Joubert. The ferment of urea, M. Musculus considers of the class of soluble (and not organic) ferments. The authors affirm that his soluble ferment is produced by the small organic ferment of urea.—Observations on M. Pasteur's communication, and on the theory of fermentations, by M. Berthelot.—Reply by M. Pasteur.—Note on M. Cros' paper regarding photographic reproduction of the colour of bodies, by M. Becquerel.—On the carpellary theory according to the Amaryllideæ (third part: Galanthus, Leucoium), by M. Trecul.—Third note on electric transmissions through the ground, by M. du Moncel. The currents due to difference of humidity in the ground about the plates arise through difference in facility of oxidation. Those due to unequal extent of surface of the plates arise because the electric action from physical contact of two heterogeneous bodies varies with their surface of contact, and because oxidable bodies are more attacked when they present a small surface to oxidation, than when they present a large.—Examination of new methods proposed for finding the position of a ship on the sea (continued), by M. Ledieu.—New series of observations on the protuberances and solar spots.—Letter from R. Secchi (June 28). A table is given for the first six months of 1876. Few protuberances; hardly any eruption; threads of gas rising straight and vertically, and of short duration. The issuing hydrogen seems to push aside the darker layer of absorbing metals, and thus produce very small faculæ. Since March almost no spots with nucleus and penumbra. Maxima of activity in latitudes 10° to 20°, and 50° to 60°.—On a luminous phenomenon at Port Said and Suez, on June 15, by M. de Lesseps. This was a luminous globe which burst like a rocket, with loud detonations.—On the metallic nickel extracted from ores of New Caledonia, by MM. Christofle and Bouilhet.—On the mode of employment of sulpho-carbonates, by M. Jaubert.—Present state of vines subjected to treatment with sulpho-carbonate of potassium since last year, by M. Mouillefert.—Experiments on the destruction of Phylloxera, by M. Marion.—Automatic discharges for electro-atmospheric rods, by M. Serra-Carpi.—On Glaucoma and the climate of Algeria by M. Tavignot.—Studies of astronomical photography, by M. Cornu. Any telescope may be immediately adapted for it by separating the two lenses of the object-glass, by a distance depending on the glass, but rarely more than 1½ per cent. of the focal distance. The original achromatism of the visible rays is transformed into achromatism of the chemical rays necessary for photographic images, and there is no aberration in the images.—On linear differential equations of the second order, by M. Fuchs.—On the isochronism of the cylindrical regulating spiral, by M. Caspari.—On Mr. Crookes's radiometer, by M. Govi.—On the explanation of the motion of the radiometer by means of the theory of emission, by M. de Fonvielle.—On the radiometer, by M. Ducretet.—New peroxide of manganese battery, by M. Leclanché. He compresses strongly a mixture of 40 per cent. of the peroxide, 55 per cent. of retort carbon, and 5 per cent. of gum lac resin. The depolarising mass is thus made to yield more electricity.—Action of hydracids on selenious acid, by M. Ditte.—On the decomposition of insoluble carbonates by sulphuretted hydrogen, by MM. Naudin and de Montholon.—On a new method of substitution of chlorine and bromine in organic compounds, by M. Damoiseau. This is by bringing them together in presence of animal charcoal.—On the synthesis of allantoin, by M. Grimaux.—On a new butylic glycol, by M. Nevolé.—New method of alcoometry by distillation of alcalinised spirits, by M. Maumené.—Researches on fuchsine in wines, by M. Jacquemin.—On nitralizarine, by M. Rosenstiehl.—New mineral contained in a meteorite (daubrelite), by Mr. Lawrence Smith.—On the presence of nickel in ferruginous atmospheric dusts, by M. Tissandier. This favours the idea of their cosmic origin.—Comparative micrographic analysis of atmospheric ferruginous corpuscles, and fragments detached from the surface of meteorites, by M. Tissandier.—On the physiology of the musical apparatus of the grasshopper, by M. Carlet. A special muscle distends the plaited membrane, which thus reinforces the sound. There is no tensor muscle of the timbal, and the two timbals producing the sound vibrate synchronously.—On the toxical action of methylic, cuprylic, œnanthylic, and cetylic alcohols, by MM. Dujardin, Beaumetz, and Audigé.—Anatomical characters of the blood in the anæmic, by M. Hayem. In chronic anæmia the globules are smaller, deformed, and less coloured.—Anæsthesia by the method of intravenous injections of chloral, by M. Linhart.—Lichens brought from Campbell Island, by M. Filhol, determined by M. Nylander.—On a hippopotamus with six lower incisors found in Algeria, by M. Gaudry.—On the morphology of the dental system in human races and its comparison with that of apes, by M. Lambert.

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